SCAG
New Travel Demand Model

Presented to the
Plans & Programs Technical Advisory Committee

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Deng-Bang Lee
Manager
Modeling Division
Information Services Department

Southern California Association of Governments

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SCAG New Travel Demand Model

- **Four-Step Model**
  - Trip Generation
  - Trip Distribution
  - Mode Choice
  - Assignment
- **Updated Components**
  - Detailed Socioeconomic Data
  - Vehicle Availability Models
  - Household Classification Models
  - Trip Production and Attraction Models
  - Trip-Based Purposes
  - Home-Based Work Strategic
  - Calibrate to Post-Census Travel Survey
  - New Volume Delay Curves
    - (Akcelik functions)

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What's New

- Use TransCAD / PC
  - GIS interface
- Modeling Area
  - Cover all SCAG region
- New Zonal System
  - 4109 TAZs
  - 31 port zones
- Network
  - GIS-based network

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Current Status

- Model Calibration
  - 2000 CTPP
  - SCAG post-census household travel survey
  - 2000 HPMS & transit on-board survey
- Model Validation
  - 2003 screenline count
  - 2003 PeMs database
  - 2003 HPMS & transit on-board survey
- Sensitivity Analysis
  - Test year of 2030
  - Continue sensitivity test with other years' data
- Will be ready for next RTP

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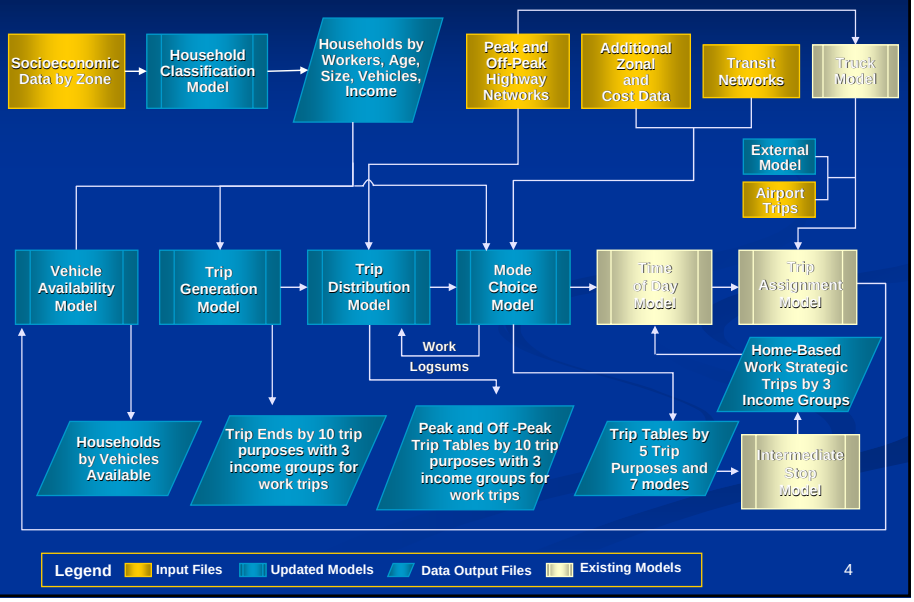
SCAG Regional Modeling Process



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Trip Generation

Vehicle Availability Models

- Independent Variables Include:
  - Persons per household
  - Workers per household
  - Household income
  - Age of head of household
    - Driving Age, 16-64
    - Retired Age, over 65
  - Accessibility
    - Highway
    - Transit

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Trip Generation

Vehicle Availability Models Estimation Summary

2000 Model Result

HH Cars	0	1	2	3	4+	Sum
Imperial	11.2%	34.0%	36.3%	13.4%	5.1%	100.0%
Los Angeles	12.4%	36.8%	34.7%	11.3%	4.8%	100.0%
Orange	5.9%	31.3%	42.5%	14.1%	6.1%	100.0%
Riverside	7.3%	35.1%	39.0%	13.2%	5.4%	100.0%
San Bernardino	8.2%	32.9%	38.4%	14.5%	6.0%	100.0%
Ventura	5.3%	28.5%	43.0%	16.1%	7.1%	100.0%
SCAG	10.1%	34.9%	37.2%	12.5%	5.3%	100.0%

2000 Census

HH Cars	0	1	2	3	4+	Sum
Imperial	11.1%	34.0%	36.3%	13.4%	5.1%	100.0%
Los Angeles	12.6%	37.0%	34.5%	11.3%	4.8%	100.0%
Orange	5.8%	31.1%	42.6%	14.3%	6.2%	100.0%
Riverside	7.1%	34.7%	39.3%	13.5%	5.5%	100.0%
San Bernardino	8.0%	32.4%	38.7%	14.7%	6.2%	100.0%
Ventura	5.0%	28.0%	43.3%	16.4%	7.3%	100.0%
SCAG	10.1%	34.9%	37.2%	12.6%	5.3%	100.0%

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Trip Generation

Trip Purpose

- Home Based Work
  - Direct
  - Strategic
  - By 3 income categories
- Non Home Based
  - Work-Other
  - Other-Other
- Home Based Other
  - Shopping
  - School (K-12)
  - College
  - Social/Recreational
  - Serving Passenger
  - Other

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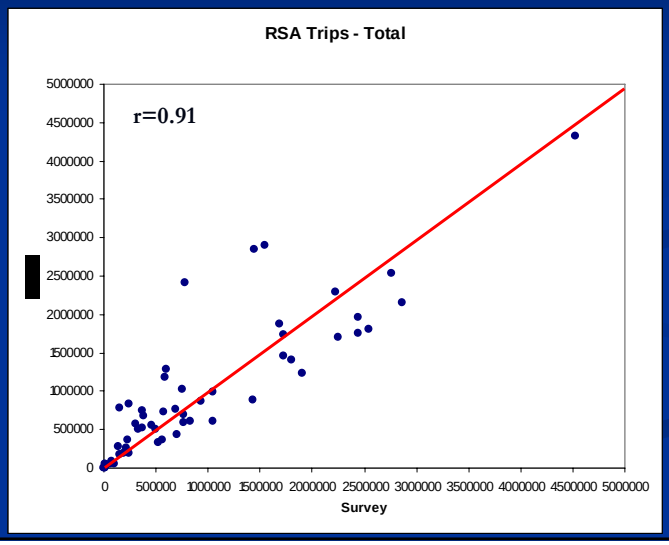
Trip Generation

2000 Trip Production by RSA – Total Trips

Correlation of trip production between model estimates and household survey



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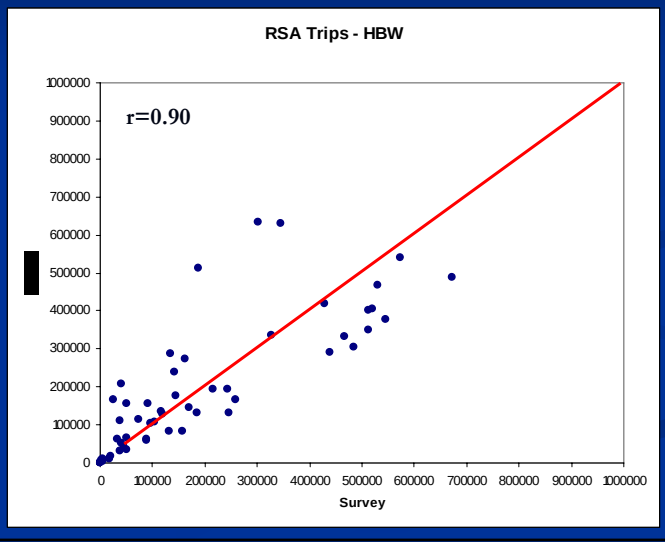
Trip Generation

2000 Trip Production by RSA - HBW

Correlation of trip production between model estimates and household survey



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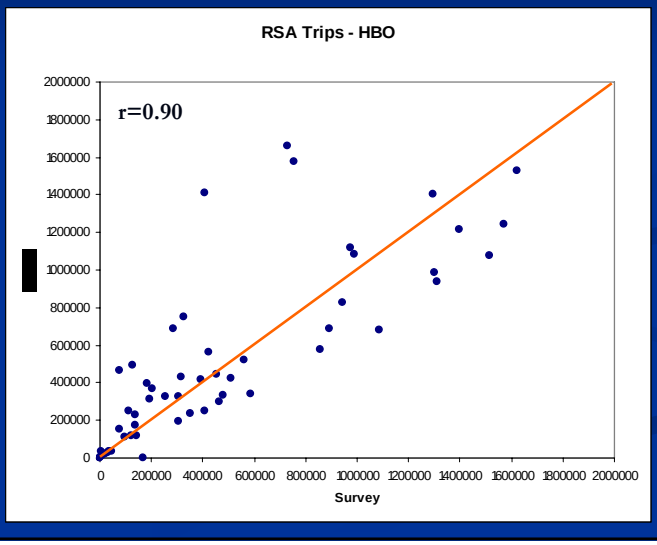
Trip Generation

2000 Trip Production by RSA - HBO

Correlation of trip production between model estimates and household survey



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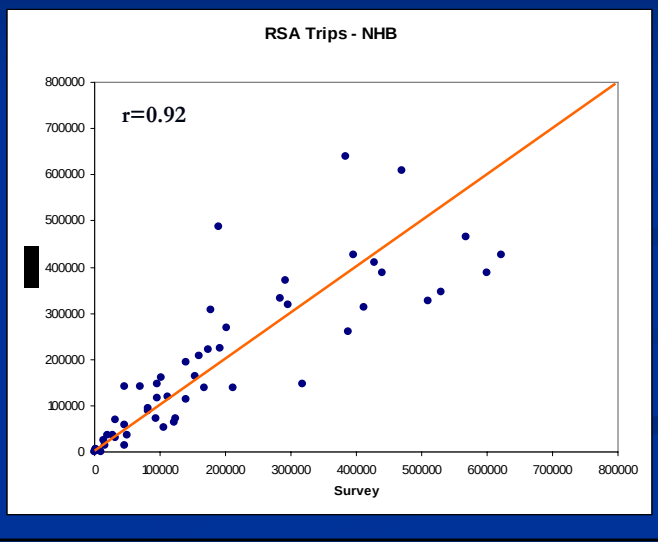
Trip Generation

2000 Trip Production by RSA - NHB

Correlation of trip production between model estimates and household survey



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Trip Distribution

- Calibrate new friction factors by trip purpose, income group (for work trips), and time period (peak/off-peak)
- Gamma function adjusted for short and long trips by trip purpose
- Logsum from mode choice used in home-based work direct trips
- Intermediate stop choice models allocate home-based work strategic trips to intermediate stops after mode choice

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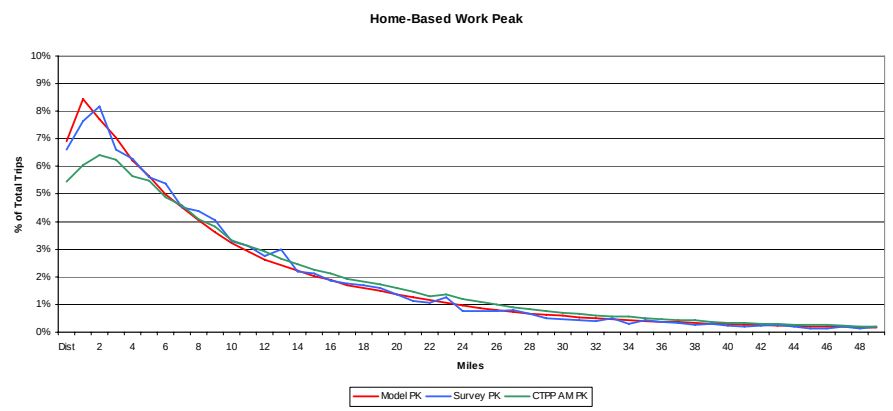
Trip Distribution

2000 Trip Length Distribution (HBW – Peak)



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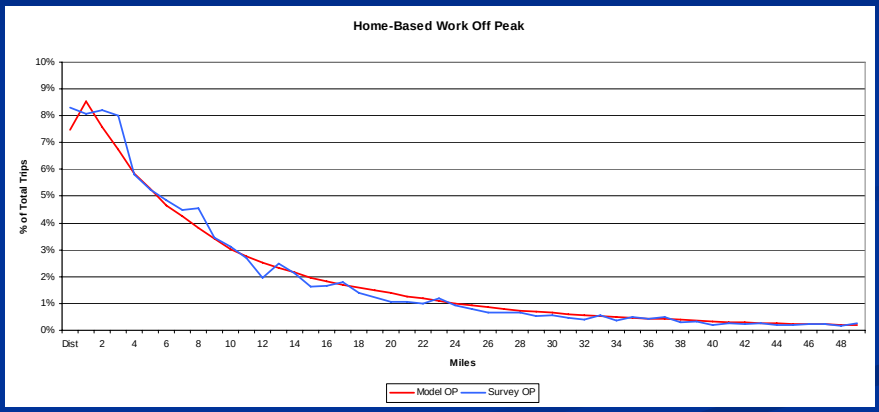
Trip Distribution

2000 Trip Length Distribution (HBW – Off Peak)



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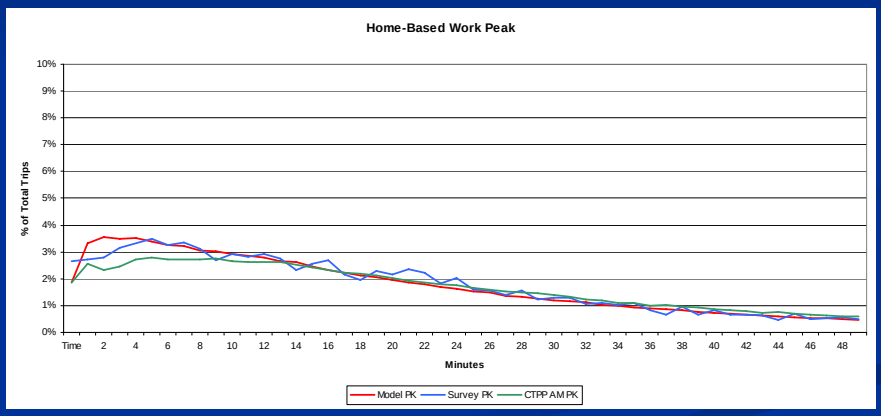
Trip Distribution

2000 Trip Travel Time Distribution (HBW Peak)



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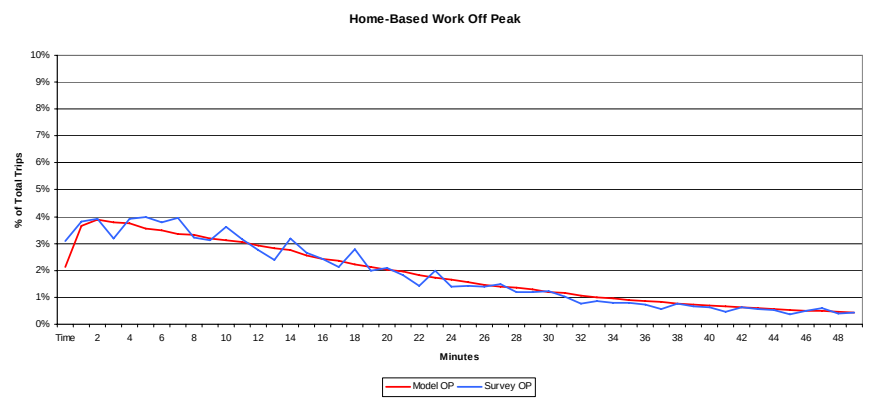
Trip Distribution

2000 Trip Travel Time Distribution (HBW Off Peak)



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Mode Choice

Modes

- Drive Alone
- Shared Ride 2
- Shared Ride 3+
- Bike
- Walk
- Local Bus (Walk and Drive Access)
- Express Bus (Walk and Drive Access)
- Urban Rail (Walk and Drive Access)
- Commuter Rail (Walk and Drive Access and Walk and Drive Egress)
- High-Speed Rail (Walk and Drive Access) for future year models

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Mode Choice

Model Variables

- In-Vehicle Travel Time for Auto, Transit, Walk and Bike
- HOV time saved
- Distance
- Highway Terminal Times
- Transit Times
  - Walk Access/Egress and Transfer Walk Time
  - Initial Wait Time (First 7 minutes and >7 minutes)
  - Transfer Wait Time(s)
  - Transit Auto Access/Egress Time
- Parking Costs, Transit Fare, Auto Operating Costs per Household Income Group
- CBD Type Flag (Attraction Zone)
- Number of Autos per Person
- Peak Period Flag

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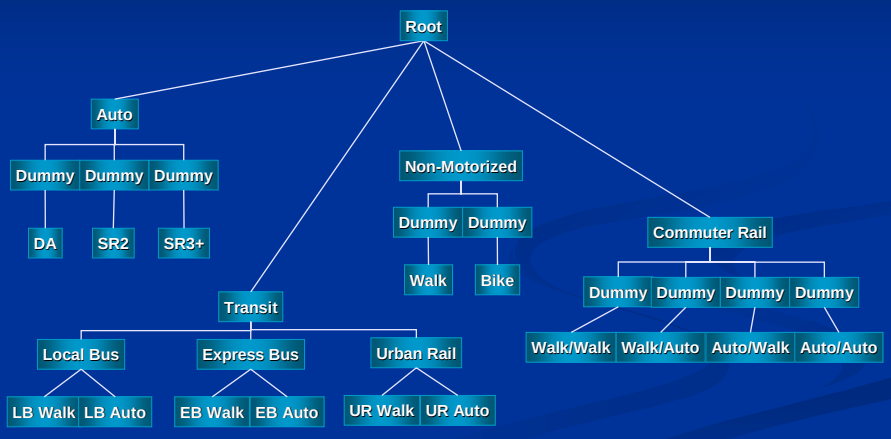
Mode Choice Model Nested Structure

Work, College, Shopping and Non-Home Trips



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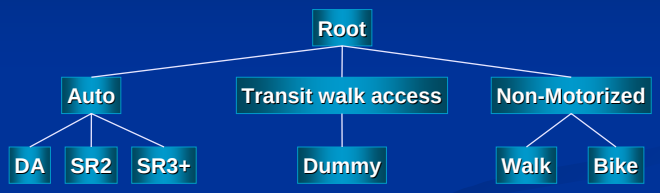
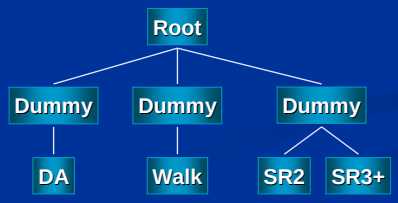
Mode Choice Model Nested Structure

School and Strategic Trips

- Home-based School Trips



- Home-based Work Strategic Trips



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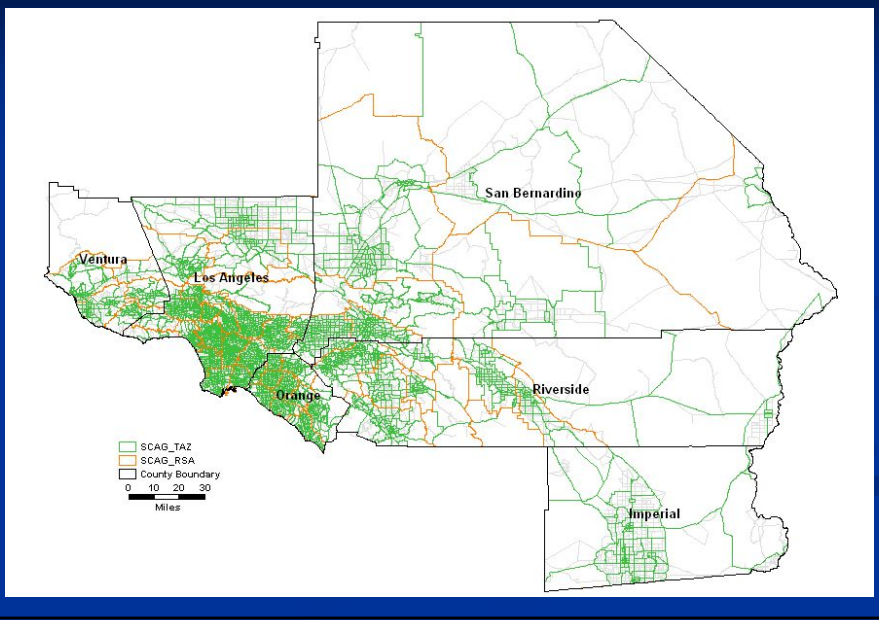
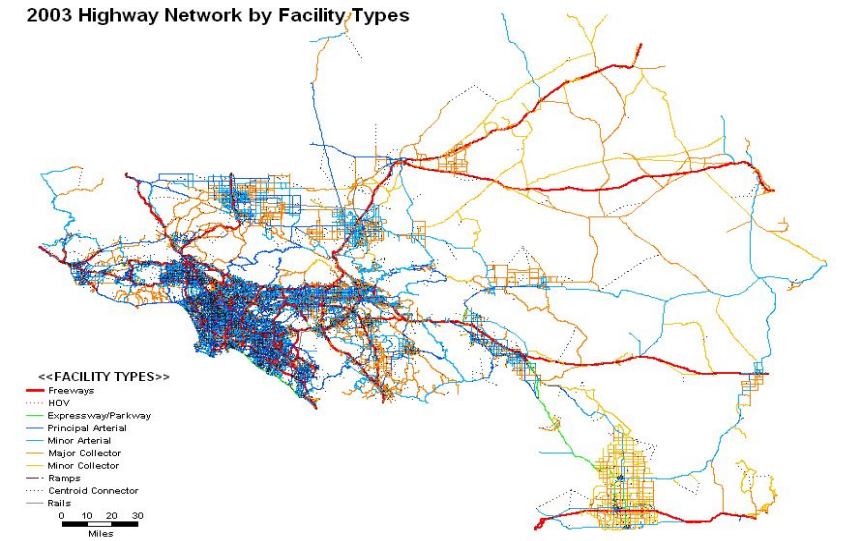
New SCAG Model Boundary



Highway Network



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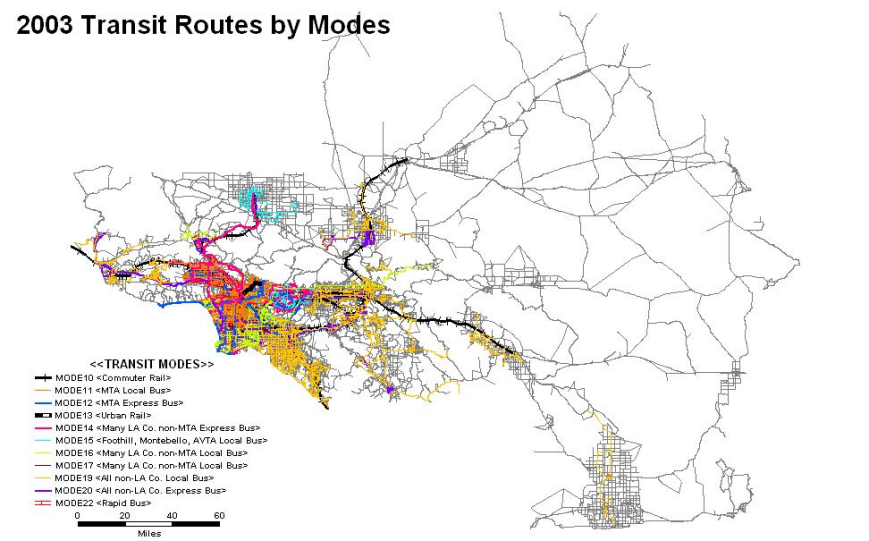
Transit Routes



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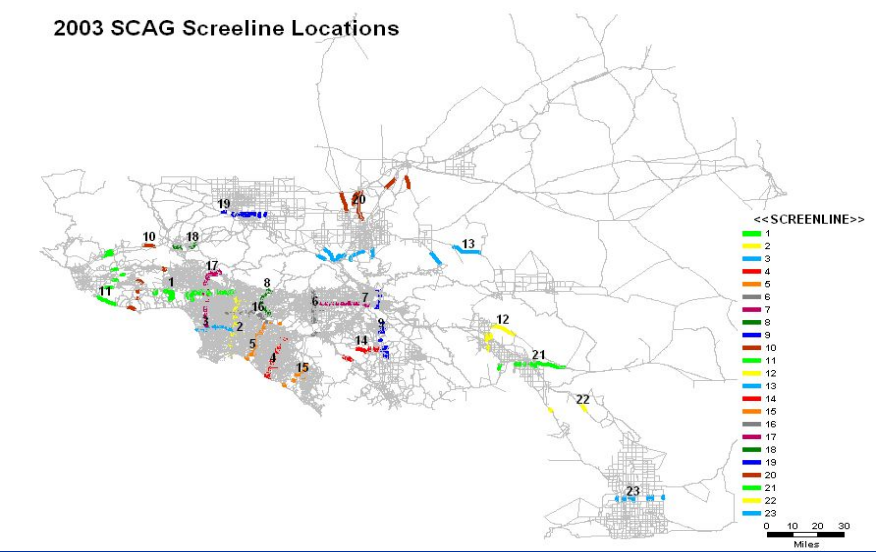
Screenline Locations



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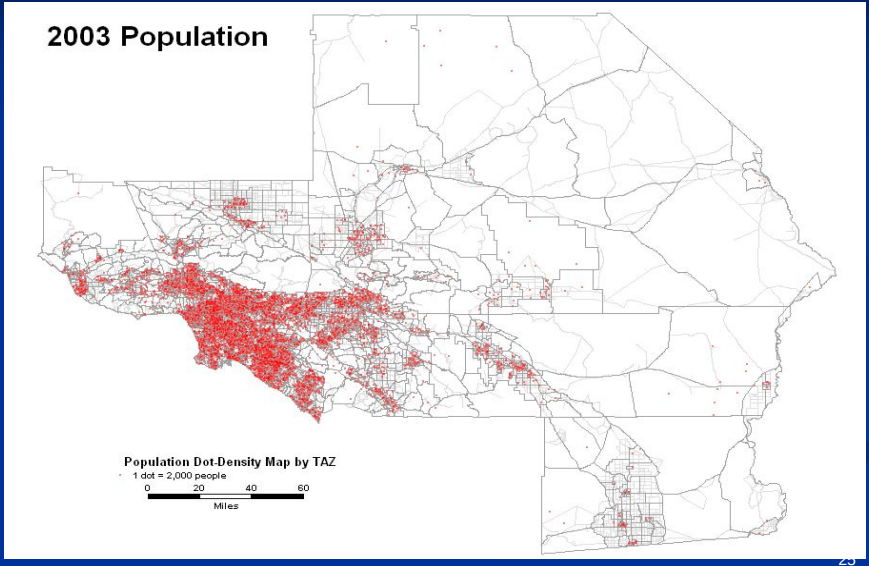
2003 Population



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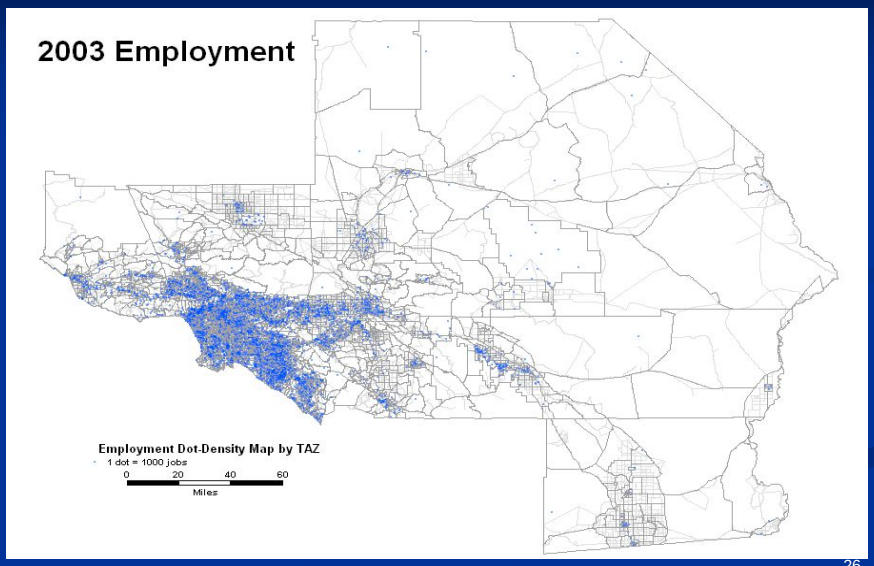
2003 Employment



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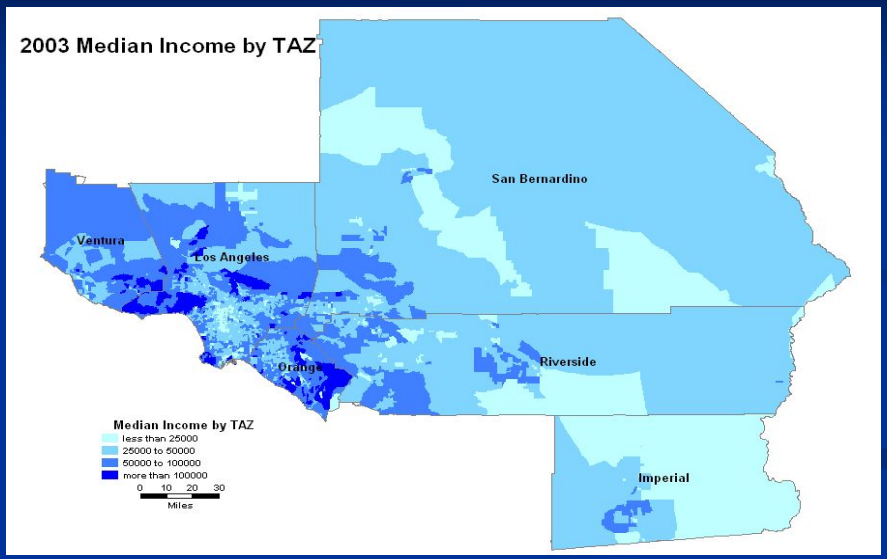
2003 Median Income



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Draft Year 2003 Model Result Summary

YEAR 2003 SUMMARY OF HIGHWAY ASSIGNMENT STATISTICS BY TIME PERIOD					
Light and Medium Duty Vehicles	**AM PEAK**	**PM PEAK**	**MIDDAY**	**NIGHT**	**TOTAL**
Average Speed (mph)	33	28	38	44	**34**
Vehicle Miles Traveled (`000)	75,112	122,168	110,601	70,698	**378,579**
Vehicle Hours Traveled (`000)	2,303	4,406	2,945	1,614	**11,268**
Vehicle Hours Delay (`000)	667	1,661	529	96	**2,953**
Heavy Duty Vehicles	**AM PEAK**	**PM PEAK**	**MIDDAY**	**NIGHT**	**TOTAL**
Average Speed (mph)	37	32	43	52	**41**
Vehicle Miles Traveled (`000)	3,394	6,891	9,313	9,068	**28,666**
Vehicle Hours Traveled (`000)	92	218	218	176	**704**
Vehicle Hours Delay (`000)	26	80	42	10	**158**
All Vehicles Combined	**AM PEAK**	**PM PEAK**	**MIDDAY**	**NIGHT**	**TOTAL**
Average Speed (mph)	33	28	38	45	**34**
Vehicle Miles Traveled (`000)	78,507	129,058	119,913	79,767	**407,245**
Vehicle Hours Traveled (`000)	2,395	4,624	3,163	1,790	**11,972**
Vehicle Hours Delay (`000)	693	1,741	571	106	**3,111**

Note: Intrazonal vmt is not included in the total vmt.

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Thank you

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